

We claim:

1. A router comprising:
 - a communication fabric;
 - a plurality of active line cards connected to said communication fabric;
 - 5 a protection line card connected to said communication fabric and configured with outbound path tables for use in conjunction with traffic from said communication fabric bound for a router port, said outbound path tables being clones of outbound path tables in one of said active line cards; and
 - a data forwarding module in each of said active line cards operative to respond to
 - 10 externally received messages bound for said one of said active line cards by directing such externally received messages through said communication fabric to said protection line card as well as to said one of said active line cards.
2. The router of claim 1 wherein said data forwarding module directs an externally
- 15 received message addressed to said one of said active line cards through said communication fabric to said protection line card as well as to said one of said active line cards by adding an address to a slot corresponding to said protection line card onto the externally received message.
- 20 3. The router of claim 1 further comprising inbound path tables in said protection line card for use in conjunction with routing externally received messages, said inbound path tables being clones of inbound path tables in said one of said active line cards.
4. The router of claim 1 further comprising a bus connecting said protection line card
- 25 with said one of said active line cards over which a periodic signal is sent by the active line card to said protection line card.
5. A router comprising:
 - a communication fabric;
 - 30 a plurality of active line cards connected to said communication fabric, each having inbound and outbound paths, wherein an externally received message passes

through the inbound path and, based upon descriptors in an inbound path table, is directed through said fabric;

a protection line card connected to said communication fabric for backing up one of said active line cards; and

5 bridging means for modifying the descriptors in said active line cards so that messages directed to said one of said active line cards are also directed to said protection line card.

6. The router of claim 5 wherein said protection line card has inbound path tables
10 that are clones of inbound path tables in said one of said active line cards.

7. The router of claim 5 wherein said protection line card has outbound path tables that are clones of outbound path tables in said one of said active line cards.

15 8. The router of claim 5 further comprising means for detecting a failure in said active line card.

9. A router comprising:
a communication fabric;
20 a plurality of line cards, each having an inbound path leading to said communication fabric and an outbound path leading from said communication fabric;
a data forwarding module on each of said line cards having access to information identifying an association between an active one of said line cards and a protection one of said line cards so that the module uses the information to forward messages bound for the
25 active line card to also go to its associated protection line card.

10. The router of claim 9 wherein said data forwarding module directs messages bound for the active line card through said switching fabric to the protection line card as well as to the active line card by adding a slot number corresponding to the protection line
30 card onto the message.

11. The router of claim 9 further comprising a bus connecting the protection line card with the active line card over which a periodic signal is sent by the active line card to said protection line card.

5 12. A method for protecting a route from an active line card in a first router having a plurality of line cards to an active line card in a second router having a plurality of line cards comprising:

providing a protection line card in the first router in connection with a protection line card in the second router;

10 detecting a failure of the active line card in the first router;

revising protection association information stored in the plurality of line cards of the first router such that messages directed through a fabric of the first router to the active line card in the first router are also directed through the fabric to said protection line card.

15 13. The method of claim 12 wherein the act of revising precedes detecting a failure.

14. The method of claim 12 further comprising revising protection association information stored in the plurality of line cards of the second router such that messages directed through a fabric of the second router to the active line card in the second router
20 are also directed to said protection line card in the second router.

15. The method of claim 12 further comprising disabling the active line card physical card interface and enabling the protection line card physical card interface.

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16. The method of claim 12 wherein said act of detecting comprises failing to detect an expected periodic heartbeat signal from the active line card.

17. The method of claim 12 wherein the protection association information is found in descriptors stored in the plurality of line cards and further comprising adding a header
30 with data from one of the descriptors to a message so that the message is directed to said protection line card.

18. In a router having a plurality of line cards connected by a fabric, a protection method comprising:

- revising descriptors stored in the plurality of line cards to indicate an association
- 5 between an active one of the line cards and a protection one of the line cards;
- receiving, in one of the line cards, a message bound for the active line card; and
- addressing the message using the revised descriptors such that the message is directed through the fabric to the active line card and also to the protection line card.

10 19. The protection method of claim 18 further comprising configuring the protection line card with inbound path tables that are clones of inbound path tables in the active line card.

20. The protection method of claim 18 further comprising detecting a failure of the active line card.

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21. The protection method of claim 20 wherein the act of detecting occurs before the act of revising.

20 22. The protection method of claim 20 wherein the act of detecting comprises failing to detect an expected periodic heartbeat signal from the active line card.

23. The protection method of claim 20 further comprising disabling the active line card physical card interface and enabling the protection line card physical card interface.

25 24. A computer program product for use in a router having a plurality of line cards, the computer program product comprising a computer usable medium having computer readable program therein, the computer readable program code comprising:

- program code for configuring a protection line card with outbound path tables that are clones of outbound path tables in an assigned line card; and

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